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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,408	03/09/2004	Donald S. Fritz	060889-0053 (formerly 981	4114
7590 03/21/2005			EXAMINER	
MORGAN, LEWIS & BOCKIUS LLP 3300 Hillview Avenue Palo Alto, CA 94304			THAI, LUAN C	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/797,408

Applicant(s)

FRITZ, DONALD S. 

Examiner

Luan Thai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 31-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31-34 is/are rejected.
- 7) ☒ Claim(s) 35 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

This Office action is responsive to the amendment filed February 28, 2005.

Claims **31-35** are pending in this application.

Claims **1-30** have been cancelled.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claim 31 is rejected under 35 U.S.C. 102(e) as being anticipated by Chia et al. (6,081,997).

Regarding claim 31, Chia et al. disclose (see specifically figure 1) a method of underfilling a gap between a multi-sided semiconductor device (12) and a chip carrier (14) on which it is mounted to encapsulate a plurality of electrical connections (16) formed therebetween wherein the chip carrier (14) is mounted on an intermediate mounting substrate (20), comprising: forming a channel (18/22) extending through the intermediate mounting substrate (20) and the chip carrier (14) to the gap; and dispensing through the channel an under-fill material (32) into said gap.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chia et al. (6,081,997) in view of Degani et al. (6,074,897).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 32, Chia et al. disclose the claimed invention as detailed above except for specifying that the channel permits the removal of residual flux.

Degani et al. while related to a similar method of underfilling a gap between a semiconductor device and a carrier teach the size of the channel being large enough to enable an adequate flow rate for the cleaning fluid through the separations between the interconnections and the gap to remove the flux residues (Col. 5, lines 59+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Degani's teachings to Chia et al.'s method for the purpose of cleaning the flux residues before dispensing the under-fill material into the gap between a semiconductor device and a carrier and such application is held to be within the ordinary designing ability expected of a person skilled in the art.

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5. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chia et al. (6,081,997).

Regarding claims 33-34, Chia et al. disclose the claimed invention as detailed above except for teaching the chip carrier having a first coefficient of thermal expansion different from a coefficient of thermal expansion of the semiconductor device (as recited in claim 33) and from a coefficient of thermal expansion of the intermediate mounting substrate (as recited in claim 34).

Chia et al. do teach that the chip carrier (14) is made of fiberglass-epoxy (Col. 5, lines 58+), and thus, the coefficient of thermal expansion of fiberglass-epoxy is obviously different from a coefficient of thermal expansion of silicon, which is a common material for making semiconductor chip (12), and obviously different from a coefficient of thermal expansion of a metal, which is commonly used for making the intermediate mounting substrate (20) (the lower mold section).

***Allowable Subject Matter***

6. Claim 35 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is an examiner's statement of reasons for allowance:

The prior art taken either singly or in combination fails to anticipate or fairly suggest the intermediate mounting substrate being adapted for connection to a printed circuit board, the intermediate mounting substrate having a coefficient of thermal

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expansion different from a coefficient of thermal expansion of the chip carrier and smaller than a coefficient of thermal expansion of the printed circuit board, as recited in claim 35.

### ***Conclusion***

8. Applicant's arguments with respect to claims **31-34** have been fully considered, but they are deemed to be moot in view of the new grounds of rejection.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action because the newly added limitations (e.g., the underlined portions) in claim 31 raise new issues that would require further consideration and/or search. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is 571-272-1935. The examiner can normally be reached on 6:30 AM - 5:00 PM, Monday to Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley W. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in cursive script, appearing to read 'Luan Thai', with a long horizontal flourish extending to the right.

**Luan Thai**

Primary Examiner

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March 17, 2005